A Non-Invasive Health Monitoring System using Visible Light Communication

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ABSTRACT— In this paper a medical imaging technique is based on Li-Fi technology. Blood glucose sugar level is tested by using insulin in normal stage. There a new method is developed to monitor the measure of blood glucose continuously with sensor using LED and photo. The glucose level is continuously monitored by using visible light communication (VLC). Li-Fi technology is faster compared with WIFI and also have no effect on body.

Keywords- Medical imaging, blood glucose, LED, VLC.

1. Introduction

In the era of advanced technology it is necessary to find better solution for every day activity. Nowadays health maintance cost are increasing to minimise the expense of medical maintance advanced technology is used. An archetype of VLC is used to transmit and receive signal, the signal is compared and the error is calculated. VLC operates in (400nm -780nm) prefers smart light emitting diode (LED) is used for illumination and an add on function for communication is their switching time is more than 1000 times per second [1]. Observation of patient is done by Li-Fi technology which has less bandwidth when compared with Wi-Fi. To overcome this problem Li-Fi technology is used for healthy environment.

LIFI

Li-Fi is a wireless communication technology which is used to transmit signals. The new age wireless technology that's ready to create an impact is termed as Li-Fi, which acesses internet through light instead of using traditional radio frequency [2]. At present days LED is used for communication based on light for illumination. This project represents about the communication of data consist of white LED that transmit audio signals to the receiver. The receiver in the Li-Fi converts audio signal to electronic signals. The receiver will have solar panel in which th amplifier and the speakers are connected to recover back the amplified version to original input signal. The RF band is the small portion of electromagnetic spectrum available for data transfer [3]. Li-Fi can contribute much more than the existing technologies using RF as a signal carrier (e.g. bluetooth). It is a preeding technology with high data transmission rates, safety for human use and security [4]. Here we are using a new technology of wireless communication.Therefore, we proposed a connection protection mechanism that cooperates with wireless network and visible light communication to achieve reliability and performance in industrial communication network. In this project we are transmitting text / sensor data / audio through Li-Fi.

LIGHT COMMUNICATION

Light fidelity is transmission of data through wireless optical medium. Sensors are used to transmit light through Li-Fi module. Sensors used such as heart beat, temperature and monitor sensor. Pulses are generated in the form of digital (i.e. 0s and 1s). a semiconductor diode is used to convert light into current and the diode is placed at the receiver end. Burning of light takes place at the rate of 100mbs. By using radio frequency, the receiver is connected to the mobile phone. The data received in the mobile can be displayed in the mobile through application. Li-Fi technology has a secured zone communication in which transmission of data by light through wireless is termed as visible light communication (VLC).

NEED OF LIFI

Li-Fi facultative the system mistreatment totally networked wireless communication and will give a affiliation that's a hundread times quicker than local area network. It will reach races to 3Gpbs by mistreatment DMT modulation. The signal of Li-Fi cannot bear the wall. Whereas the signal of local area network will bear the wall, it will cause the vulnerbilities in information loss and information leak.

RELATED WORK

1. Li-Fi based mostly Health observance System for Infants usually, in Hospital Nurseries, nurses area unit taking care

of abnormalities and therefore the health of the new born babies however they'll not be out there for taking care of the Infants 24⁄7. So, generally within the absence of care taker it should happens that health of the baby becomes important. Wireless technologies utilized by completely different baby observance Systems contain radiations that area unit extremely harmful for the Infants. So, below these important conditions, we've got projected associate degree Automatic Wireless Li-Fi based mostly Advanced baby observance System that unendingly measures the intensive parameter of the child's health victimisation wearable sensors, if any abnormaly happens, it'll indicate a notification.: 2019 ordinal International Conference on Communication, Computing and Digital systems (C-CODE)

2. The idea of the house health observance it's extremely fascinating to scale back the necessity for medical services by maintaining the health of the population, and intensive observance of health parameters is probably going to become necessary to achieve this goal. a replacement idea of health observance is delineate, within which a personality's health parameters area unit mechanically monitored reception while not troubling their daily activities. we have a tendency to review and show tries at developing such observance techniques, that embody observance throughout sleep, via the tub or seat, daily activities and daily behavior. These studies show that home health observance are often achieved with developed sensors and instruments. conjointly we have a tendency to show that observance daily behavior are often realised with solely straightforward sensors and systems. to understand this idea, absolutely machine-driven objective evaluations and/or analysis of knowledge should be developed and enormous scale process analysis is crucial for those evaluations. Proceedings fifth International Workshop on Enterprise Networking and Computing in aid business (Health Com)

3. Patient observance victimisation actinic radiation transmission knowledge transmission Patient health observance technology presents nice potential for future aid applications and frequency (RF) communication is that the preferred medium for its implementation. This paper presents a static indoor patient observance theme victimisation transmission actinic radiation Communication (VLC) appropriate for hospital environments. VLC is taken into account rather than RF communication as a result of health issues relating to continuous RF exposure to patients for health observance. The projected theme is meant for transmission patient knowledge victimisation VLC through On-Off Keying (OOK) modulation. Experiments were conducted with many body-sensors knowledge transmitted victimisation predefined headers. The experiment results show that the projected VLC based mostly patient observance theme can give correct observance knowledge transmission with token interference with the assistance of house diversity. 2015 International conference on Intelligent Signal process and Communication Systems (ISPACS)

4. Transmission of medicine signal victimisation VLC based mostly system in hospitals Communication in hospitals has invariably been reason for concern thanks to alternative media of communication. Radio frequency (RF) that not solely have an effect on sensitive machinery gift within the hospital however conjointly individual by several suggests that. once the machinery is affected its output is affected that indirectly distorts result from body parameters of individual, and so doctor cannot decide unwellness if any. another is to be created that may let correct flow of knowledge, in addition as does not have an effect on individual. A projected system includes continuous observance of

body parameters and transferring the information with the assistance of actinic radiation Communication (VLC) technology and streaming identical on web site so doctor will decide the results unendingly and treat patient instantly. The system includes use of microcontroller MSP430 for observance patient body parameters, driver electronic equipment for LEDs, LDR towards receiver finish and therefore the node MCU module to store knowledge on cloud and show result on website in 2019 third International Conference and IP (ICOEI)

5. Lighting fixture human action in infrared and visual for indoor health observance during this paper, we have a tendency to propose a full optical wireless two-way communication system supported infrared (IR) and visual lightweight Communication (VLC) for indoor health observance presumptuous patient quality within the indoor surroundings. supported ray tracing strategies and applied math approach for evaluating channel gain of each links, we have a tendency to verify a world performance in terms of outage likelihood. Our main contribution is that the analysis of this overall performance for a medical observance state of affairs for a patient sporting associate degree IR transmitter and a VLC receiver. we have a tendency to show that it's doable to satisfy associate degree overall quality of service for numerous medical detector applications. Specifically, we have a tendency to area unit able to valuate the minimum emitted IR and VLC power values on each links. Having a coffee IR power is an evident advantage considering the energy consumption problems for a worn device.

6. VLC technology has emerged as another wireless communication thanks to numerous blessings like

presence, low energy consumption, no frequency (RF) radiation, and security against unsought network access. important bio-medical signal together with the diagnostic procedure (ECG) are often transferred with VLC even in places wherever RF is impermissible. This potential advantage of VLC may save additional emergency patients. The time hopping theme is adopted to transmit multiple medical knowledge with keeping an easy system style. Multiple knowledge streams undergo associate degree optical detector together with a photodiode and multiple knowledge area unit separated by TH rectifier at the receiver.

EXISTING SYSTEM

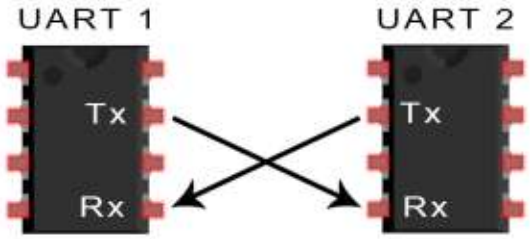
In the projected system, the new non-invasive methodology is conferred. Here sensing element is to observe the blood sugar level of the patient. the most advantage of {this system this technique this methodology is measure the blood sugar level in non-invasive method. The result are often viewed within the sensible phone. High rise of aldohexose level could result in heart failure or any issue things. Non-invasive aldohexose observation may build scores of folks a lot of relaxed and comfy concerning blood sugar testing. diode non-invasive blood sugar sensing element is employed to find the blood sugar content, if any abnormality happens the intimation is distributed to mobile. High Level aldohexose hypoglycaemic agent gismo are Injected From Servo Motor aspect if high aldohexose detected. This info area unit change ceaselessly in mobile via Li-Fi technology.

PROJECT WORKING DESCRIPTION

In the planned system the patient is monitored victimisation Li-Fi rather than Wi-Fi. It reduces the radio interference within the physique. Patient is monitored victimisation completely different sensors like EKG, heart beat and motion detector. The detected knowledge is then born-again into digital type within the microcontroller. The output of the microcontroller is shipped to the Li-Fi module. the info is then transmitted within the type of lightweight through the Li-Fi module and detected within the receiver facet by the ikon detector. The received is shipped to the involved person through mobile.

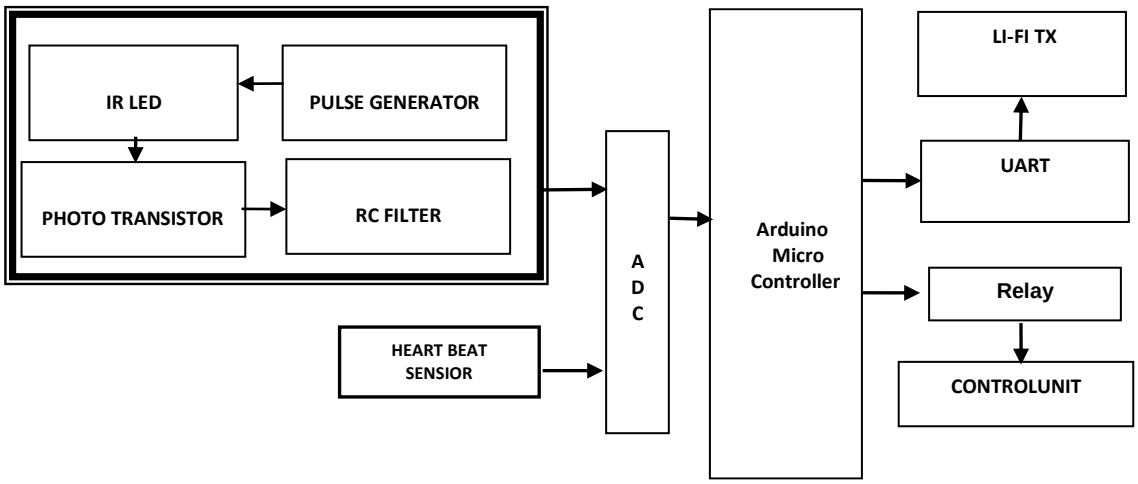
UART COMMUNICATION

In UART communication, 2 UARTs communicate directly with one another. The transmission UART converts parallel knowledge from a dominant device sort of a electronic equipment into serial kind, transmits it in serial to the receiving UART, that then converts the serial knowledge into parallel knowledge for the receiving device. solely 2 wires square measure required to transmit knowledge between 2 UARTs. knowledge flows from the Lone-Star State pin of the transmission UART to the Rx pin of the receiving UART:



UARTs transmit knowledge asynchronously and suggests there's no clock signal to synchronize the output of bits of the transmission UART to the sampling of bits of the receiving UART. rather than a clock signal, the transmission of UART adds begin and stop bits to the information packet being transferred. These bits outline the start and finish of the information packet that the receiving UART is aware of once to begin reading the bits. When the receiving UART detects a begin bit, it starts to browse the incoming bits at a selected frequency called the information measure. live may be a measure of the speed of knowledge transfer, expressed in bits per second (bps). each UARTs should operate at regarding constant information measure. The information measure between the transmission and receiving UARTs will solely disagree by regarding 100% before the temporal arrangement of bits gets too far flung.

BLOCK DIAGRAM



WORKING

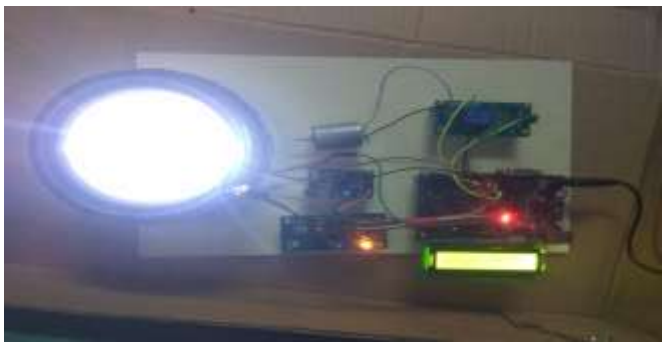
The operating of the Li-Fi module is incredibly easy. It uses the construct of LEDs wherever logic one represents the information transmission and logic zero represents that there's no transfer of information. The patient observation victimisation the Li-Fi is finished with the assistance of sensors. The sensors that are utilized in this model are graph, heart beat which is able to perform its necessary perform. The perceived knowledge are born-again into the digital type victimisation the Analog to digital device that is constitutional within the microcontroller ATMEGA328P (attached with Arduino board). the information is then transmitted within the sort of lightweight through the Li-Fi module. The on and also the off of the lights indicates the presence and also the absence of the data. fast pulses are generated by the unsteady of those LEDs that produces string of 0s and 1s. The light is detected within the receiver facet by the icon detector.

CONCLUSION

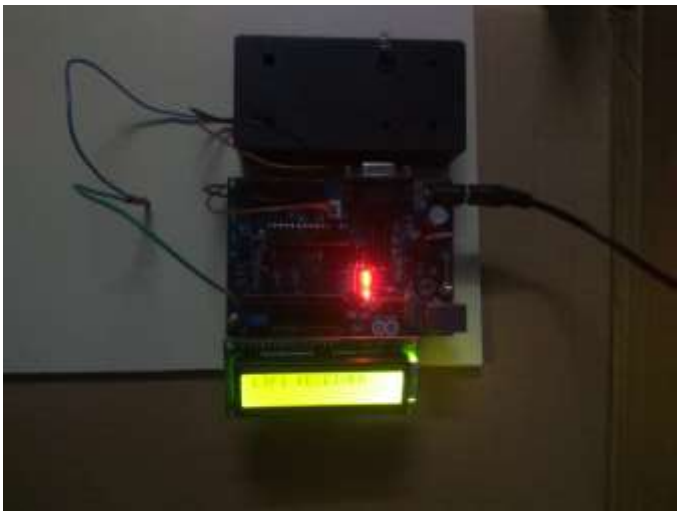
The purpose of Li-Fi technology is to produce a high-speed electronic communication victimisation visible radiation spectrum. currently Li-Fi is on-going of analysis, it's a possible advantage which will create a supplement RF communication and may be accustomed improve wireless network performance. though Li-Fi features a smart performance within the transfer rate, Li-Fi isn't adequate once deploy in an out of doors in daylight or alternative condition. Li-Fi can most likely not utterly replace local area network, these 2 technologies are often used along to realize a lot of economical and secure network. Patient observance are often It measures the info of the patient mechanically and ceaselessly. within the future this technique are often accustomed monitor several patients. Every Bulb within the hospital are often accustomed monitor the patient

RESULT AND ANALYSIS

LIFI TRANSMITTER



LIFI RECEIVER



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